CALICORP SCB SERIES

STEEL BARRIER DAM SYSTEM

Product Estimating Guide

Version 3
April 12, 2006

AREA SURVEY

Composition Of Floor

Concrete - concrete may need to be treated. Old sealing coats need to be removed and surface neutralized. New concrete should be thoroughly cured.

Linoleum, vinyl or asbestos tiles. Thorough cleaning and stripping of old wax is required.

If the tile is asbestos then special measures must be taken to eliminate the possibility of breathing asbestos dust. If mechanical scarification is required, special equipment should be used to abrade the surface.

The Elastomer/Novolac coatings can be used to encapsulate asbestos tile.

Wood - surface must be clean and dry. Any seams or joints must be filled and free from flexing. Flexible seams (joints) may cause cracking.

Condition of floor

The floor coatings will adhere to the tile, so the integrity of the floor coating is based on the tile-substrate adhesion quality. Tiles must not be loose.

You will need to arrange for replacement tiles and other repairs as necessary in order to have a good foundation before coating preparation and application.

If surplus plant is still in place, arrange for its removal prior to installing the spill containment system.

Holes and other surface defects should be filled before applying the coatings.

Is there any damage from previous spills? Spilled electrolyte that was not treated properly may have resulted in deterioration of floor surfaces. Tiles may be loose. Concrete may be "chalky" and suffer loss of strength. Repairs should be made before installing the spill containment system.

Clean-up and neutralization of previous spills should be completed prior to applying the floor coatings. Floors should be cleaned with a good citrus-based detergent. Old wax must be removed.

Floor surface must be adequately treated to insure adhesion. If you are going to coat floor areas that will be subject to foot and equipment traffic, professional application is strongly recommended. Application of coating material by inexperienced or non-professional applicators may void manufacturers warranty.

Concrete surfaces that will be coated should be "roughed up." Concrete that has been mechanically abraded may be subject to outgassing, which can cause pinhole bubbles in the undercoat during cure time. The CAL551-101 primer will seal concrete and prevent outgassing.

The costs of cleaning and pre-conditioning should be estimated and including in the total cost of your project.

Installation Considerations

Fiberglass battery racks with zero floor-clearance pose special problems. These racks, or stands completely cover a major part of the floor area immediately under the batteries, and interfere with coating the floor to make it liquid-tight. All holes and seams up to 4-inches from the floor must be plugged and sealed. Any entry point for falling electrolyte must be sealed to prevent electrolyte from getting to untreated floor surfaces. Caulking and special high-elongation coatings are available from your Calicorp representative.

A wall can be used as part of the spill containment barrier. Barrier parts can be attached to the wall and the wall masked and coated, just as if it was a barrier part. This allows spill containment placed around a battery rack that butts up against a wall or partition.

If there are any walls or protrusions into proposed spill barrier areas, design the barrier to compensate for the condition. Complete seismic bracing, if required, prior to installing the spill containment system.

If the building is located in a seismic-prone area, you may wish to coat the entire battery area floor. This will ensure that a seismic-generated spill will not be released to the environment.

Barriers must have at least 1-inch clearance from the battery rack in all directions in order to comply with UFCÔ Article 64. When measuring, remember to consider any overhanging parts of the battery rack.

Determine if any cable ducts are in the floor area to be covered. Extra materials will be required to build barriers around these, if access will be required in the future. If access is not planned, they can be covered with the coating materials. An extra-flexible undercoat/topcoat combination is available if required. Contact your Calicorp Representative for more information.

Expansion joints must be treated if encountered in the spill containment area if complete liquid-tight integrity is to be attained. Again, as mentioned above, an elastomeric basecoat with higher elongation is available, that will allow sealing of All battery room floor drains should be sealed to prevent any possible electrolyte leaks from reaching the sewer system.

Refer any open drains to Customer Building Engineer. Temporary plugs are available that allow opening to drain non-hazardous materials.

MEASUREMENTS

Measuring for Spill Containment Barriers

Measure each battery rack. Enter the length and width (in inches) on the Worksheet. Use grid paper to draw the floorplan showing the layout of the battery racks. Determine the size of the Spill Containment Barrier that best suits each Battery Rack. Allow for at least 1" clearance around each rack on all sides. This is the basic requirement of the UFCÔ . The barrier base is 1.25", so if you add 3" to rack length and width measurements you will have enough room for the barrier base plus a 0.25" extra clearance. Also, the barrier must be able to contain all the electrolyte from the largest battery in the string.

The dimensions of the barrier should take into consideration the type of rack or stand to be surrounded. For standard racks, that have floor clearance, the 1" extension should provide sufficient capacity. For round cells in stands with zero floor clearance, extra considerations should be made. A typical battery jar may contain 35 quarts of electrolyte, some as high as 70 quarts. A quart of electrolyte occupies 57.75 cubic inches of space. Therefore, 35 quarts would require 2022 cubic inches of barrier capacity. With a 4" barrier, this works out to 506 square inches of floor space. A six module battery stand, with zero floor clearance, measures 30"x 90," and will occupy 2700 square inches of floor space inside the spill barrier. To contain a spill from one cell, means the 505 square inches of required capacity is to be added to the space occupied by the battery stand, or 3205 square inches. A 35" x 94" x 4" barrier would meet all requirements. This is explained by the following formula:

(BC x 57.75)/4 + BSA = Spill Barrier Area (for zero floor clearance stands).

Where:

BC = Capacity of largest battery, in quarts.
BSA = Total area occupied by battery stand, in square inches.

Consideration can be given to extend the barriers out more that the required one inch in high seismic threat areas. Make sure the aisles will still be wide enough for battery maintenance equipment, e.g. battery hoists.

Spill barrier kits are made up of standard parts (Corner Brackets, Extension Brackets, 12", 24", 30", 36", 48" and 60" lengths). All kit lengths and widths are made up from these parts. Longer lengths are avoided for battery plant safety. Our pricing plan is based on these standard sizes, however, the kits will be trimmed to your exact size requirements at the factory before shipping.

Barrier kits are provided with all hardware and adhesive required for assembly. Bolts and nuts are stainless steel. The sections are pre-coated with an acid-proof epoxy coating. When measuring,

remember to allow for any earthquake bracing, pillars, columns or other obstructions that can change the shape of the required barrier from a simple rectangle.

Measuring for Surface coatings

The square footage within the barriers for each rack should be on the last line of the first section of the Job Estimate Work Sheet. If you do not intend to coat the entire battery room floor, these figures give you what you need to determine the amount of surface coating materials needed.

You can make the entire battery room floor a spill containment area. The entire floor can be coated, including up to 4" on the surrounding walls. This would reduce the possibility of a release of hazardous materials (electrolyte) to the environment during an earthquake, fire or battery room explosion. If you chose to do this, it is recommended that a professional applicator be used to apply the surface coatings. Proper floor preparation and coating application are critical in foot and equipment traffic areas.

Floorcoat (CAL551-220). Plan on a thickness of about 16 to 20 mils. Thickness should be determined by floor condition. Coverage per Gallon is about 147 sq. ft. at 10 mil thickness. At 20 mil thickness coverage will be about 73 square feet. The mixture out of the can will fill small surface cracks. If floor condition warrants, Thixatropic fibers can be added to allow the undercoat to fill surface cracks (up to 5/16").

Extra thick coats can be used to cover surface blemishes and defects. Flow coats up to 125 mils (1/8") have been used. This undercoat is self-leveling. Estimate your quantity, based on how thick this coat has to be. For example, at 125 mils, coverage is reduced to about 12 square feet!

If the barrier butts up against a vertical wall, the wall can become part of the barrier. Approximately 20 mil Coatings on vertical wall surfaces will be sufficient. You will have to apply several thin coats to build up to 20 mils. Since the coating material is self-leveling, it tends to run on vertical surfaces.

If floor surface has holes, cracks or depressions greater than 5/16" plan on using CAL551-311 patch filler compound before applying the Floorcoat. This patch compound is permanent. It is used to patch Freeway road surfaces, it is hard and sets fast!

Determine extent of expansion joints or ducts to be sealed, if any. This may require CAL551-005 High-elongation Undercoat before applying the CAL551-220 Floorcoat. This undercoat is quite flexible. The 551-005 can be used as floorcoating, however it can withstand only 50% concentration sulfuric acid. If higher acid resistance is required, or foot and equipment traffic is expected, you should apply the CAL551-220 Floorcoat. This combination can be cut with a sharp cutting edge, such as a linoleum knife, if access to the duct or cable slot is needed in the future.

In the case of inclosed battery rooms, where the entire room is designated as a spill containment area, the battery room floor (and up to 4" of surrounding walls) can be protected with the floorcoating. In this case where foot and equipment traffic is common, special anti-skid additives to the top floorcoat will eliminate slip hazards. We still recommend using spill barrier kits around racks or groups of racks to prevent spills from reaching adjacent equipment and also posing a threat to spill response personnel.

Measuring for Batt-Mats

Absorbing and Neutralizing pads (CAL551-900, Batt-Mat) are 12" by 12" The one square foot size makes it easy for quantity estimation. Round your length and width measurements up to the nearest foot. Multiply to get square footage. Order one per square foot of area within the spill containment barriers,

plus five percent for any bare spots that may be created when fitting the pillows around rack feet. Round up to nearest ten (Mats are shipped in boxes of 10). You may wish to have enough spares to replace those that absorb the electrolyte from the largest battery in the string. You will have to determine the quantity of electrolyte in the largest size battery in the string. It is possible that in smaller size racks to cover the floor with Batt-Mats and not have enough to absorb 60 quarts of electrolyte. Be sure to order enough Batt-Mats to handle the potential electrolyte spill. A Batt-Mat will absorb over 3 quarts of electrolyte and neutralize the sulfuric acid in about 1.7 quarts of electrolyte. Determine the amount of electrolyte (quarts) in the largest battery. The Clean Up Kits contain some replacement mats. Determine the amount of spares you feel you need.

Miscellaneous Items

Determine the number of Spill Clean-up Kits required. There should be at least one kit for each battery room. In large battery rooms you may need more than one.

If you are installing more than one spill barrier kit and they are relatively close to each other, savings can be made by reducing the gallons of floor coating you use. Once the hardener is added to the resin all must be used in a relatively short period of time due to pot life (see coating product discriptions). Remember, two thin coats are better than one thick coat. Air bubbles can be introduced into the coating material as it is mixed with too much vigor. These bubbles, if allowed to remain after the coating material is applied, can compromise the integrity of the seal. Two coats provide safeguard against this from occuring.

ORDERING PROCEDURE

Once you have determined barrier sizes, coating and pillow quantities and response kits required call your Calicorp Representative. Prices are based on the total volume of items purchased over a period of time. The more you order, the more the prices go down. Your representative can advise you on any particular installation situation you may have. Experienced and qualified applicators are available if you desire a professional installation.